National Aeronautics and
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**Lyndon B. Johnson Space Center**
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Reply to Attn of: EG-DIV-06-24

NASA Ames Research Center
Attn: Michael Wright, PhD
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To Whom It May Concern:

The purpose of this letter is to heartily endorse the nomination of the Data Parallel Line Relaxation (DPLR) Computational Fluid Dynamics (CFD) Code for NASA's Software of the Year Award. This recommendation is based on the significant role the DPLR software played during the Space Shuttle Return-to-Flight activities and the important role it is playing in the development of the Crew Exploration Vehicle (CEV) aerodynamic and aerothermodynamic databases. Conventional ground based wind tunnels do not have the capabilities to model the requisite flow physics involved during hypersonic return from low earth orbit and the moon. Due to this lack of applicable test data, accurate computational predictions are required, especially for a man-rated vehicle. The DPLR Code has gone through thorough benchmarking to verify software implementation and the physical models it employs. Although the code has been compared to historical data, Dr. Wright continues to find new test cases to demonstrate the accuracy of the code. This push to continually improve the code is what sets it apart from most other flow solvers. He is very extremely responsive to user input and questions.

My organization has chosen to make extensive use of the DPLR software because it combines proven numerical algorithms and modern software development practices to provide robust simulations and achieve scalable performance. The software achieves high performance on a wide range of massively parallel computing architectures due to its well planned implementation. Further, the software structure has proven flexible enough to allow for improvements in core functions such as turbulence modeling and grid adaptation without requiring significant modification to the core of the code. Additionally, the DPLR code is an ideal fit for creating the aerodynamic and aerothermodynamic databases for CEV because of its ease of use. We have found that new users can be trained within a week to run the CEV re-entry configuration, allowing many of our engineers to participate in the database development.

Without a doubt, the DPLR software is a critical component in the successful development of the CEV aerodynamic and aerothermodynamic databases. For this reason, and those given above, I am in full support of the DPLR Code nomination for NASA's Software of the Year Award.

Cordially,

Randolph P. Lillard

Randolph P. Lillard
CEV Aerothermodynamics Sub-System Manager